

Proceedings



19th ACM/IEEE International Conference on Model Driven Engineering Languages and Systems

MODELS'16

Conference Chairs: Benoit Baudry, Benoit Combemale

Program Chairs: Jörg Kienzle, Alexander Pretschner

Saint-Malo, France, October 2-7, 2016

The Association for Computing Machinery
2 Penn Plaza, Suite 701
New York New York 10121-0701

ACM COPYRIGHT NOTICE. Copyright 2016 by the Association for Computing Machinery, Inc. Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Publications Dept., ACM, Inc., fax+1 (212) 869-0481, or permissions@acm.org.

For other copying of articles that carry a code at the bottom of the first or last page, copying is permitted provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, +1-978-750-8400, +1-978-750-4470 (fax).

Notice to Past Authors of ACM-Published Articles

ACM intends to create a complete electronic archive of all articles and/or other material previously published by ACM. If you have written a work that was previously published by ACM in any journal or conference proceedings prior to 1978, or any SIG Newsletter at any time, and you do NOT want this work to appear in the ACM Digital Library, please inform permissions@acm.org, stating the title of the work, the author(s), and where and when published.

ACM ISBN: 978-1-4503-4321-3/16/10

Preface to the 19th International ACM/IEEE Conference on Model Driven Engineering Languages and Systems

We cheerfully welcome you to MODELS 2016, the 19th International ACM/ IEEE Conference on Model Driven Engineering Languages and Systems, October 2-7, 2016 in Saint-Malo, France, the *corsair* city! The walled town is built like a stone ship facing out to sea, with its ramparts standing proudly over long beaches and a lively port.

MODELS is the premier conference series for model-based software and systems engineering. It covers all aspects of modeling, from languages and methods to tools and applications since 1998. MODELS 2016 challenges the modeling community to promote the magic of modeling by solidifying and extending the foundations and successful applications of modeling in areas such as business information and embedded systems, but also by exploring the use of modeling for new and emerging systems, paradigms, and challenges including cyber-physical systems, cloud computing, services, social media, security, and open source.

We managed to put together an exciting program for researchers, industrial practitioners, students, and educators in the field of model-driven engineering. MODELS 2016 comprises two main tracks: the *Foundations* track with sub-categories *technical papers*, *new ideas papers* and *visions papers*, and the *Practice and Innovation* track. Both tracks invited full, scholarly papers of the highest quality, and submissions were reviewed in accordance with the highest established standards of scientific rigor applied in peer review. Each paper was reviewed by at least three members of the program committee. The reviewers assessed the submissions in terms of research problem formulations, novelty and sophistication of proposed solutions, clarity and significance of hypotheses, proper design and execution of experimental or analytical assessments, sound interpretation of data, and correct characterization of work in relation to existing knowledge. The review discussions were overseen by members of the program board, and decisions were finalized during a physical program board meeting on July 1st and July 2nd in Vienna, Austria. This year, out of 118 papers submitted to the Foundations Track, the PC and the PB accepted 28 (acceptance rate 23.7%). Out of the 27 papers submitted

to the PI Track, 10 were accepted (acceptance rate 37%).

The main conference also hosts 14 workshops, 9 tutorials, the educator and doctoral symposia, an ACM Student Research Competition, and the SAM conference.

The conference program includes demo sessions, a panel on “User Experience (UX) in Model-Based Software Engineering,” and the presentation of four papers that had first been published in the predominant journal in the field, the Journal of Software Systems Modeling, or SOSYM. We are honored to furthermore feature three distinguished keynotes: Gordon Blair will reflect on “Grand Challenges, Grand Responses,” Jim Coplien will argue that “The Straight Line is Ungodly,” and Edward A. Lee will argue for “Resurrecting Laplace’s Demon: The Case for Deterministic Models.”

MODELS 2016 would not have been possible without the significant contributions of many individuals and organisations. The MODELS Steering Committee provided invaluable assistance and guidance, whilst the Program Committee and the Program Board undertook with dedication the critical tasks of reviewing and discussing the submissions. We are also grateful to members of the Organising Committee for making the necessary arrangements and helping to publicize the conference and prepare the proceedings. We thank the authors for their efforts in writing and revising their papers in accordance with feedback from the reviewers. We would also like to thank our numerous sponsors: the platinum sponsor Thales, the gold sponsor Eclipse, the silver sponsors Obeo, Tata Consultancy Services and Papyrus IC, and the bronze sponsors GEMOC, Plugbee and Polarsys, in addition to our sustainable sponsors ACM, ACM Sigsoft, IEEE and IEEE Computer Society, our supporting publisher Springer, and our institutional sponsors Inria, University of Rennes 1 and its foundation, the Brittany region and the city of Saint-Malo.

We hope you will enjoy the conference!

Jörg Kienzle, Alexander Pretschner, Benoit Baudry and Benoit Combemale

Organizing Committee

General Chairs



Benoit Baudry
Inria, France
models2016-gc@inria.fr



Benoit Combemale
Inria, France
models2016-gc@inria.fr

Program chair (Foundations Track)



Jörg Kienzle
McGill University, Canada
models2016-pc@inria.fr

Program chair (MEIP Track)



Alexander Pretschner
TU München, Germany
models2016-pc@inria.fr

Workshop co-chairs

models2016-workshops@inria.fr



Houari Sahraoui
University of Montréal, Canada



Manuel Wimmer
Vienna University of Technology, Austria

Tutorial Chairs

models2016-tutorials@inria.fr



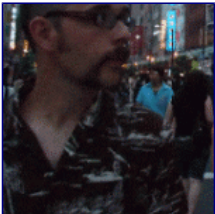
Martin Gogolla
University of Bremen, Germany



Geri Georg
Colorado State University, USA

Tool / Demonstration Chairs

models2016-demos@inria.fr



Juan de Lara
University of Madrid, Spain



Peter J. Clarke
Florida International University, USA

Poster Chair



Mehrdad Sabetzadeh
University of Luxembourg, Luxembourg
mehrdad.sabetzadeh@uni.lu

Panel Chair



Don Batory

University of Texas, Austin, USA

batory@cs.utexas.edu

ACM Student Research Competition Chairs



Jeff Gray

University of Alabama, USA



Ruth Breu

University of Innsbruck, Austria

Doctoral Symposium Chairs

models2016-doctoral-symp@inria.fr



Rick Salay

University of Toronto, Canada



Shiva Nejati

University of Luxembourg, Luxembourg

Educator Symposium Chairs

models2016-educator-symp@inria.fr



Gunter Mussbacher

McGill University, Canada



Henry Muccini

University of L'Aquila, Italy

Clinic Chair



Gaël Blondelle
Eclipse, France

Publication Chair



Julien DeAntoni
University of Nice, France

Publicity Chairs

models2016-publicity@inria.fr



Jeff Gray
University of Alabama, USA
North America



Richard Paige
University of York, United Kingdom
Europe



Alessandro Garcia
PUC-Rio, Brasil
South America



Zhenjiang Hu
National Institute of Informatics, Japan
Asia



Jim Steel

University of Queensland, Australia
Oceania

Sponsorship Chair



Jordi Cabot

Open University of Catalonia, Spain

Local Arrangements Chair



Elisabeth Lebret

Inria, France

models2016-local@inria.fr

Administrative Assistant



Tifenn Donguy

Inria, France

Multimedia Chair



Olivier Barais
University of Rennes 1, France

Social Media Chair



Mathieu Acher
University of Rennes 1, France

Local and student volunteers co-chairs

models2016-volunteers@inria.fr



Arnaud Blouin
INSA, France



Johann Bourcier
University of Rennes 1, France

Website chairs

models2016-website@inria.fr



Guillaume Bécan
University of Rennes 1, France



Dorian Leroy
Inria, France

Communication chair



Nathalie Lacaux
Inria, France

Photos



Noël Plouzeau
University of Rennes 1, France

Program Board



Jordi Cabot
ICREA – UOC, Spain



Marsha Chechik
University of Toronto, Canada



Betty H. C. Cheng
Michigan State University, USA



Gregor Engels
University of Paderborn, Germany



Jeff Gray
University of Alabama, USA



Jean-Marc Jézéquel
University of Rennes 1, France



Gerti Kappel
Technische Universität Wien, Austria



Thomas Kühne
Victoria University of Wellington,
New Zealand



Vinay Kulkarni
Tata Consultancy Services Research, India



Bernhard Schätz
fortiss GmbH, Germany



Bran Selic
Malina Software Corp., Canada



Antonio Vallecillo
University of Malaga, Spain



Friedrich Steimann
Fernuniversität in Hagen, Germany



Daniel Varro
Budapest University of Technology
and Economics, Hungary

Foundation Track Program Committee

- **Silvia Abrahão**, Universidad Politecnica de Valencia (Spain)
- **Shaukat Ali**, Simula Research Laboratory (Norway)
- **João Araújo**, Universidad Nova de Lisboa (Portugal)
- **Uwe Assmann**, Technische Universität Dresden (Germany)
- **Colin Atkinson**, University of Mannheim (Germany)
- **Nelly Bencomo**, Aston University (UK)
- **Arnaud Blouin**, INSA Rennes (France)
- **Lionel Briand**, University of Luxembourg (Luxembourg)
- **Manfred Broy**, Technische Universität München (Germany)
- **Jean-Michel Bruel**, University of Toulouse (France)
- **Walter Cazzola**, Università degli Studi di Milano (Italy)
- **Michel Chaudron**, Dept of CS of Chalmers and Gothenburg University (Sweden)
- **Tony Clark**, Sheffield Hallam University (UK)
- **Peter Clarke**, Florida International University (USA)
- **Philippe Collet**, University of Nice (France)
- **Krzysztof Czarnecki**, University of Waterloo (Canada)
- **Fabiano Dalpiaz**, Utrecht University (The Netherlands)
- **Julien DeAntoni**, Université de Nice (France)
- **Juergen Dingel**, Queens University (Canada)
- **Zinovy Diskin**, McMaster University and University of Waterloo (Canada)
- **Neil Ernst**, Software Engineering Institute, CMU (USA)
- **Alessandro Garcia**, PUC-Rio (Brazil)
- **Geri Georg**, Colorado State University (USA)
- **Holger Giese**, Hasso Plattner Institute at the University of Potsdam (Germany)
- **Martin Gogolla**, Universität Bremen (Germany)
- **Joel Greenyer**, Leibniz Universität Hannover (Germany)
- **Giancarlo Guizzardi**, Federal University of Espirito Santo (Brazil)
- **Stefan Hanenberg**, Universität Duisburg-Essen (Germany)
- **Reiko Heckel**, University of Leicester (UK)
- **Peter Herrmann**, Norwegian University of Science and Technology (Norway)
- **Zhenjiang Hu**, National Institute of Informatics (Japan)
- **Marouane Kessentini**, University of Michigan (USA)
- **Ferhat Khendek**, Concordia University (Canada)
- **Jacques Klein**, University of Luxembourg (Luxembourg)
- **Juan De Lara**, Universidad Autonoma de Madrid (Spain)

- **Henry Muccini**, University of L'Aquila (Italy)
- **Gunter Mussbacher**, McGill University (Canada)
- **Ileana Ober**, IRIT Universite de Toulouse (France)
- **Richard Paige**, University of York (UK)
- **Dorina Petriu**, Carleton University (Canada)
- **Arend Rensink**, University of Twente (The Netherlands)
- **Julia Rubin**, MIT (USA)
- **Bernhard Rumpe**, RWTH Aachen University (Germany)
- **Ina Schaefer**, Technische Universität Braunschweig (Germany)
- **Arnor Solberg**, SINTEF (Norway)
- **Perdita Stevens**, University of Edinburgh (UK)
- **Eugene Syriani**, Université de Montréal (Canada)
- **Andrzej Wasowski**, IT University of Copenhagen (Denmark)
- **Jon Whittle**, University of Lancaster (UK)
- **Manuel Wimmer**, Technische Universität Wien (Austria)
- **Steffen Zschaler**, King's College London (UK)

Practice & Innovation Track Program Committee

- **Achim Brucker**, University of Sheffield (UK)
- **Andreas Schmied**, CapGemini (Germany)
- **Harald Ruess**, fortiss (Germany)
- **Hardi Hungar**, OFFIS (Germany)
- **Heiko Koziolk**, ABB Corporate Research (Germany)
- **Jan Philipps**, validas AG (Germany)
- **Jörg Dörr**, Fraunhofer IESE (Germany)
- **Maged Elaasar**, Jet Propulsion Laboratory (United States)
- **Mike Whalen**, University of Minnesota (USA)
- **Oystein Haugen** (Norway)
- **Ralf Reussner** (Germany)
- **Rance Cleaveland**, University of Maryland (USA)
- **Robert Baillargeon**, MethodPark (United States)
- **Robert Eschbach**, KSB (Germany)
- **Salvador Trujillo**, Ikerlan (Spain)
- **Tao Yue**, Simula Research Laboratory (Norway)

Sponsors Platinum Level



Gold Level



Silver Level



Bronze Level



Open Source Tools for Embedded Systems Heterogeneous and Distributed Services for the Future Computing Continuum

Sustaining Sponsors



Association for Computing Machinery



Advancing Computing as a Science & Profession



Institutional Sponsors



INVENTEURS DU MONDE NUMÉRIQUE



Publishing Sponsor



MODELS'16

Table of Contents

FP → Foundation Papers PIP → Practice and Innovation Papers
NIP → New Idea Papers VP → Vision Papers

Preface	iii
Organizing Committee	iv
Program Board	xi
Program Committee	xiii
Sponsors	xv
I Domain-Specific Modelling	1
Multi-Variability Modeling and Realization for Software Derivation in Industrial Automation Management (PIP)	2
Miao Fang - <i>University of Kaiserslautern, Germany</i>	
Georg Leyh - <i>Siemens AG, Germany</i>	
Joerg Doerr - <i>Fraunhofer Institute IESE, Germany</i>	
Christoph Elsner - <i>Siemens AG, Germany</i>	
A Model-based Approach for Multi-Device User Interactions (FP)	13
Christian Prehofer - <i>fortiss GmbH, Germany</i>	
Andreas Wagner - <i>TU München, Germany</i>	
Yucheng Jin - <i>fortiss GmbH, Belgium</i>	
Using Free Modeling as an Agile Method for Developing Domain Specific Modeling Languages (PIP)	24
Fahad R. Golra - <i>Telecom Bretagne, France</i>	
Antoine Beugnard - <i>Telecom Bretagne, France</i>	
Fabien Dagnat - <i>Telecom Bretagne, France</i>	
Sylvain Guerin - <i>Openflexo, France</i>	
Christophe Guychard - <i>Openflexo, France</i>	

II Applications I	35
Supporting the Model-Driven Development of Real-time Embedded Systems with Run-Time Monitoring and Animation via Highly Customizable Code Generation (VP)	36
Nondini Das - <i>School of Computing, Queen's University, Canada, Canada</i>	
Suchita Ganesan - <i>School of Computing, Queen's University, Canada, Canada</i>	
Leo Jweda - <i>School of Computing, Queen's University, Canada, Canada</i>	
Mojtaba Bagherzadeh - <i>School of Computing, Queen's University, Canada, Canada</i>	
Nicolas Hili - <i>School of Computing, Queen's University, Canada, Canada</i>	
Juergen Dingel - <i>School of Computing, Queen's University, Canada, Canada</i>	
Model-driven Performance Prediction of Systems of Systems	44
Katrina Falkner - <i>University of Adelaide</i>	
Claudia Szabo - <i>University of Adelaide</i>	
Vanea Chiprianov - <i>University of Pau</i>	
Gavin Puddy - <i>University of Adelaide</i>	
Marianne Rieckmann - <i>University of Adelaide</i>	
Dan Fraser - <i>University of Adelaide</i>	
Cathlyn Aston - <i>University of Adelaide</i>	
Automatic Generation of Detailed Flight Plans from High-level Mission Descriptions (FP)	45
Davide Di Ruscio - <i>University of L'Aquila, Italy</i>	
Ivano Malavolta - <i>Vrije Universiteit Amsterdam, Netherlands</i>	
Patrizio Pelliccione - <i>Chalmers University of Technology / University of Gothenburg, Sweden</i>	
Massimo Tivoli - <i>University of L'Aquila, Italy</i>	
III Modelling and Formal Methods	56
Towards a Categorical Approach for Meta-Modelling Epistemic Game Theory (NIP) 57	
Fazle Rabbi - <i>Bergen University College, Bergen, Norway, Norway</i>	
Yngve Lamo - <i>Bergen University College, Norway</i>	
Ingrid Chieh Yu - <i>University of Oslo, Norway</i>	
OCL2MSFOL: A Mapping to Many-Sorted First-Order Logic for Efficiently Checking the Satisfiability of OCL Constraints (FP)	65
Carolina Dania - <i>IMDEA Software Institute, Spain</i>	
Manuel Clavel - <i>IMDEA Software Institute, Spain</i>	
On the Synthesis of Protocol State Machines from Contracts (FP)	76
Piotr Kosiuczenko - <i>Institute of Information Systems, WAT, Poland</i>	
IV Modelling Models	86
Towards the Characterization of Realistic Models: Evaluation of Multidisciplinary Graph Metrics (NIP)	87
Gabor Szarnyas - <i>Budapest University of Technology and Economics, Hungary</i>	
Zsolt Kovari - <i>Budapest University of Technology and Economics, Hungary</i>	
Agnes Salanki - <i>Budapest University of Technology and Economics, Hungary</i>	
Daniel Varro - <i>Budapest University of Technology and Economics, Hungary</i>	
Unifying Explanatory and Constructive Modeling (VP)	95
Thomas Kuehne - <i>Victoria University of Wellington, New Zealand</i>	

Metamodel Specialization for Graphical Modeling Language Support (FP)	103
Audris Kalnins - <i>Institute of Mathematics and Computer Science, University of Latvia, Latvia</i>	
Janis Barzdins - <i>Institute of Mathematics and Computer Science, University of Latvia, Latvia</i>	
V Applications II	113
Visual Modeling of RESTful Conversations with RESTalk	114
Ana Ivanchikj - <i>Universit della Svizzera italiana</i>	
Cesare Pautasso - <i>Universit della Svizzera italiana</i>	
Silvia Schreier - <i>innoQ Deutschland GmbH</i>	
Formalizing Knowledge in Multi-Scale Agent-Based Simulations (NIP)	115
Endre Somogyi - <i>Indiana University, United States</i>	
James P. Sluka - <i>Indiana University, United States</i>	
James A. Glazier - <i>Indiana University, United States</i>	
Process Mining Using BPMN: Relating Event Logs and Process Models	123
Anna A. Kalenkova - <i>National Research University Higher School of Economics</i>	
Wil M. P. van der Aalst - <i>Eindhoven University of Technology</i>	
Irina A. Lomazova - <i>National Research University Higher School of Economics</i>	
Vladimir A. Rubin - <i>Dr. Rubin IT Consulting</i>	
VI Models and Code	124
ThingML: A Language and Code Generation Framework for Heterogeneous Targets (FP)	125
Nicolas Harrant - <i>SINTEF, Norway</i>	
Franck Fleurey - <i>SINTEF, Norway</i>	
Brice Morin - <i>SINTEF, Norway</i>	
Knut Eilif Husa - <i>Tellu AS, Norway</i>	
Modern C++ as a Modeling Language for Automated Driving and Human-Robot Collaboration (NIP)	136
Daniel Tuchscherer - <i>Hochschule Heilbronn, Automotive Systems Engineering, Germany</i>	
Alexander Weibert - <i>Hochschule Heilbronn, Automotive Systems Engineering, Germany</i>	
Frank Trnkle - <i>Hochschule Heilbronn, Automotive Systems Engineering, Germany</i>	
Handling Index-Out-Of-Bounds in Safety-Critical Embedded C Code Using Model-based Development (PIP)	143
Gunter Blache - <i>ETAS GmbH, Germany</i>	
VII Empirical Investigations I	150
Controlled Experiment on the Comprehension of Runtime Phenomena Using Models Created at Design Time (FP)	151
Michael Szvetits - <i>Software Engineering Group, University of Applied Sciences Wiener Neustadt, Austria</i>	
Uwe Zdun - <i>Software Architecture Research Group, University of Vienna, Austria</i>	
Technical Debt in MDE: A Case Study on GMF/EMF-Based Projects (PIP)	162
Xiao He - <i>University of Science and Technology Beijing, China</i>	
Paris Avgeriou - <i>University of Groningen, Netherlands</i>	
Peng Liang - <i>Wuhan University, China</i>	

Zengyang Li - *Wuhan University, China*

The Quest for Open Source Projects that Use UML: Mining GitHub (FP) 173

Regina Hebig - *Chalmers / Gothenburg University, Sweden*

Truong Ho Quang - *Chalmers / Gothenburg University, Sweden*

Gregorio Robles - *GSyC/LibreSoft, Universidad Rey Juan Carlos, Spain*

Michel Chaudron - *Chalmers / Gothenburg University, Sweden*

Miguel Angel Fernandez - *GSyC/LibreSoft, Universidad Rey Juan Carlos, Spain*

VIII Testing and Simulation 184

Incremental Diagram Layout for Concrete Syntax Migration (PIP) 185

Ulf Rüegg - *Kiel University, Germany*

Rajneesh Lakkundi - *National Instruments, India*

Ashwin Prasad - *National Instruments, India*

Anand Kodaganur - *National Instruments, India*

Christoph Daniel Schulze - *Kiel University, Germany*

Reinhard von Hanxleden - *Kiel University, Germany*

A Generic Framework for Model-Set Selection for the Unification of Testing and Learning MDE Tasks (FP) 196

Edouard Batot - *DIRO, Université de Montréal, Canada*

Houari Sahraoui - *DIRO, Université de Montréal, Canada*

Towards the Verification of Industrial Communication Protocols through a Simulation Environment Based on QEMU and SystemC (PIP) 207

Calypso Barnes - *EDF R&D / University of Nice, France*

Jean-Marie Cottin - *EDF R&D, France*

Franois Verdier - *LEAT / University of Nice, France*

Alain Pegatoquet - *LEAT / University of Nice, France*

IX Empirical Investigations II 215

Descriptive vs Prescriptive Models in Industry (PIP) 216

Rogardt Heldal - *Bergen University College, Norway*

Patrizio Pelliccione - *Chalmers University of Technology — University of Gothenburg, Sweden*

Ulf Eliasson - *Volvo Car Group, Sweden*

Jonn Lantz - *Volvo Car Group, Sweden*

Jesper Derehag - *Ericsson, Sweden*

Jon Whittle - *Lancaster University, School of Computing and Communications, United Kingdom*

The Problems with Eclipse Modeling Tools: A Topic Analysis of Eclipse Forums (FP) 227

Nafiseh Kahani - *Queen's University, Canada*

Mojtaba Bagherzadeh - *Queen's University, Canada*

Juergen Dingel - *Queen's University, Canada*

James Cordy - *Queen's University, Canada*

Model-Driven Software Engineering in the openETCS Project: Project Experiences and Lessons Learned (PIP) 238

Stefan Karg - *ICS AG, Germany*

Alexander Raschke - *Ulm University, Germany*

Matthias Tichy - *Ulm University, Germany*

Grischa Liebel - *Chalmers / University of Gothenburg, Sweden*

X Advanced Algorithms and Modelling 249

Extracting Domain Models from Natural-Language Requirements: Approach and Industrial Evaluation (FP) 250

Chetan Arora - *SnT Centre for Security, Reliability and Trust, University of Luxembourg, Luxembourg*

Mehrdad Sabetzadeh - *SnT Centre for Security, Reliability and Trust, University of Luxembourg, Luxembourg*

Lionel C. Briand - *SnT Centre for Security, Reliability and Trust, University of Luxembourg, Luxembourg*

Frank Zimmer - *SES Techcom, Luxembourg*

Incremental Backward Change Propagation of View Models by Logic Solvers (FP) . 261

Oszkár Semeráth - *Budapest University of Technology and Economics, MTA-BME Lendület Research Group on Cyber-Physical Systems, Hungary*

Csaba Debrecei - *Budapest University of Technology and Economics, MTA-BME Lendület Research Group on Cyber-Physical Systems, Hungary*

Ákos Horváth - *Budapest University of Technology and Economics, Hungary*

Dániel Varró - *Budapest University of Technology and Economics, MTA-BME Lendület Research Group on Cyber-Physical Systems, Hungary*

Feature Location in Models through a Genetic Algorithm Driven by Information Retrieval Techniques (FP) 272

Jaime Font - *San Jorge University, Spain*

Lorena Arcega - *San Jorge University, Spain*

Øystein Haugen - *Østfold University College, Norway*

Carlos Cetina - *San Jorge University, Spain*

XI Model Transformation 283

A Generic Transformation Algorithm to Simplify the Development of Mapping Models (FP) 284

Matthias Freund - *Institute of Automation, Technische Universität Dresden, Germany*

Annerose Braune - *Institute of Automation, Technische Universität Dresden, Germany*

Automated Refactoring of ATL Model Transformations: A Search-Based Approach (FP) 295

Bader Alkhazi - *University of Michigan, United States*

Terry Ruas - *University of Michigan, United States*

Marouane Kessentini - *University of Michigan, United States*

Manuel Wimmer - *Vienna University of Technology, Austria*

William Grosky - *University of Michigan, United States*

Model Transformation for End-User Modelers with VMTL 305

Vlad Acretoiaie - *Technical University of Denmark*

Harald Störrle - *Technical University of Denmark*

Daniel Strüber - *Philipps-Universität Marburg*

Ground Setting Properties for an Efficient Translation of OCL in SMT-based Model Finding (FP) 306

Nils Przigoda - *Group of Computer Architecture, University of Bremen, 28359 Bremen, Germany* [✉]

Cyber-Physical Systems, DFKI GmbH, 28359 Bremen, Germany, Germany
 Robert Wille - *Institute for Integrated Circuits, Johannes Kepler University Linz, 4040 Linz, Austria*
 & *Cyber-Physical Systems, DFKI GmbH, 28359 Bremen, Germany, Austria*
 Rolf Drechsler - *Group of Computer Architecture, University of Bremen, 28359 Bremen, Germany &*
Cyber-Physical Systems, DFKI GmbH, 28359 Bremen, Germany, Germany

XII Tooling 317

Query-based Access Control for Secure Collaborative Modeling Using Bidirectional Transformations (FP) 318

Gábor Bergmann - *Budapest University of Technology and Economics; MTA-BME Lendület Research Group on Cyber-Physical Systems, Hungary*
 Csaba Debreceni - *Budapest University of Technology and Economics; MTA-BME Lendület Research Group on Cyber-Physical Systems, Hungary*
 István Ráth - *Budapest University of Technology and Economics, Hungary*
 Dániel Varró - *Budapest University of Technology and Economics; MTA-BME Lendület Research Group on Cyber-Physical Systems, Hungary*

PrefetchML: A Framework for Prefetching and Caching Models (FP) 329

Gwendal Daniel - *AtlanMod Team - Inria, Mines Nantes & Lina, France*
 Gerson Sunyé - *AtlanMod Team - Inria, Mines Nantes & Lina, France*
 Jordi Cabot - *ICREA, UOC, Spain*

Partial Loading of XMI Models (FP) 340

Ran Wei - *University of York, United Kingdom*
 Dimitrios S. Kolovos - *University of York, United Kingdom*
 Antonio Garcia-Dominguez - *University of York, United Kingdom*
 Konstantinos Barpis - *University of York, United Kingdom*
 Richard F. Paige - *University of York, United Kingdom*

Integration of a Graph-Based Model Indexer in Commercial Modelling Tools (PIP) . 351

Antonio Garcia-Dominguez - *University of York, United Kingdom*
 Konstantinos Barpis - *University of York, United Kingdom*
 Dimitrios S Kolovos - *University of York, United Kingdom*
 Marcos Aurelio Almeida | Silva - *Softteam, France*
 Antonin Abherve - *Softteam, France*
 Alessandra Bagnato - *Softteam, France*

XIII Testing and Analysis 362

Towards Mutation Analysis for Use Cases (FP) 363

Huihui Zhang - *Beihang University, China*
 Tao Yue - *Simula Research Laboratory & University of Oslo, Norway*
 Shaukat Ali - *Simula Research Laboratory, Norway*
 Chao Liu - *Beihang University, China*

A Model Management Approach for Assurance Case Reuse due to System Evolution (FP) 374

Sahar Kokaly - *McMaster University, Canada*
 Rick Salay - *University of Toronto, Canada*
 Valentin Cassano - *McMaster University, Canada*
 Tom Maibaum - *McMaster University, Canada*
 Marsha Chechik - *University of Toronto, Canada*

Automatic Detection of Incomplete Requirements via Symbolic Analysis (FP)385

Byron DeVries - *Michigan State University, United States*

Betty H.C. Cheng - *Michigan State University, United States*

A Requirement Driven Testing Method for Multi-disciplinary System Design (PIP) .396

Martial Chabot - *Schneider Electric, France*

Laurence Pierre - *TIMA Laboratory (Univ. Grenoble Alpes, CNRS, France)*

Alexandre Nabais-Moreno - *Schneider Electric, France*